

33. Кульбиты в невесомости, или разгадка "Джемини-4". Часть 3.

9-11 minutes

We continue to publish a study on how Hollywood specialists filmed E. White's spacewalk for NASA, and what means they used to create the effect of weightlessness in the pavilion.

Only 2.5 months have passed since the moment when Alexei Leonov (Voskhod-2 spacecraft, March 1965) for the first time in the world entered open space, as an American repeated the same exit - it was Edward White (Gemini -4 ", June 1965). From the point of view of the cameraman, I looked at E. White's spacewalk (the famous 9-minute clip of 1965). As a result, a large article was born, with a continuation - how it was filmed.

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In the second part, we stopped at the fact that the actor depicting an astronaut in outer space was suspended from a crane. In addition, at the end of the crane boom there was a lyre, thanks to which the actor could spin "around himself", turn around his axis. Here's a clue to how in the video the astronaut rotates 90 ° clockwise around the vertical axis and comes back.

But there is also a more cunning movement. The filming camera moves in a circle, vertically down, descends under the astronaut. We see it from the lower angle - Fig. 35.



Fig. 35. Shooting an astronaut from a lower angle.

When the glove falls, the astronaut in the frame is turned face up, and the legs are pointing towards the center of the frame.

This is how it looks from the outside. The actor still hangs on the lyre, on two piano strings. Show on the layout - the picture on the left. Here, a miniature copy of the astronaut (doll) is projected onto a black paper background. We specially left the suspension threads white so that you can see the working moments, how a movie about weightlessness is being filmed - Fig. 36, on the left.

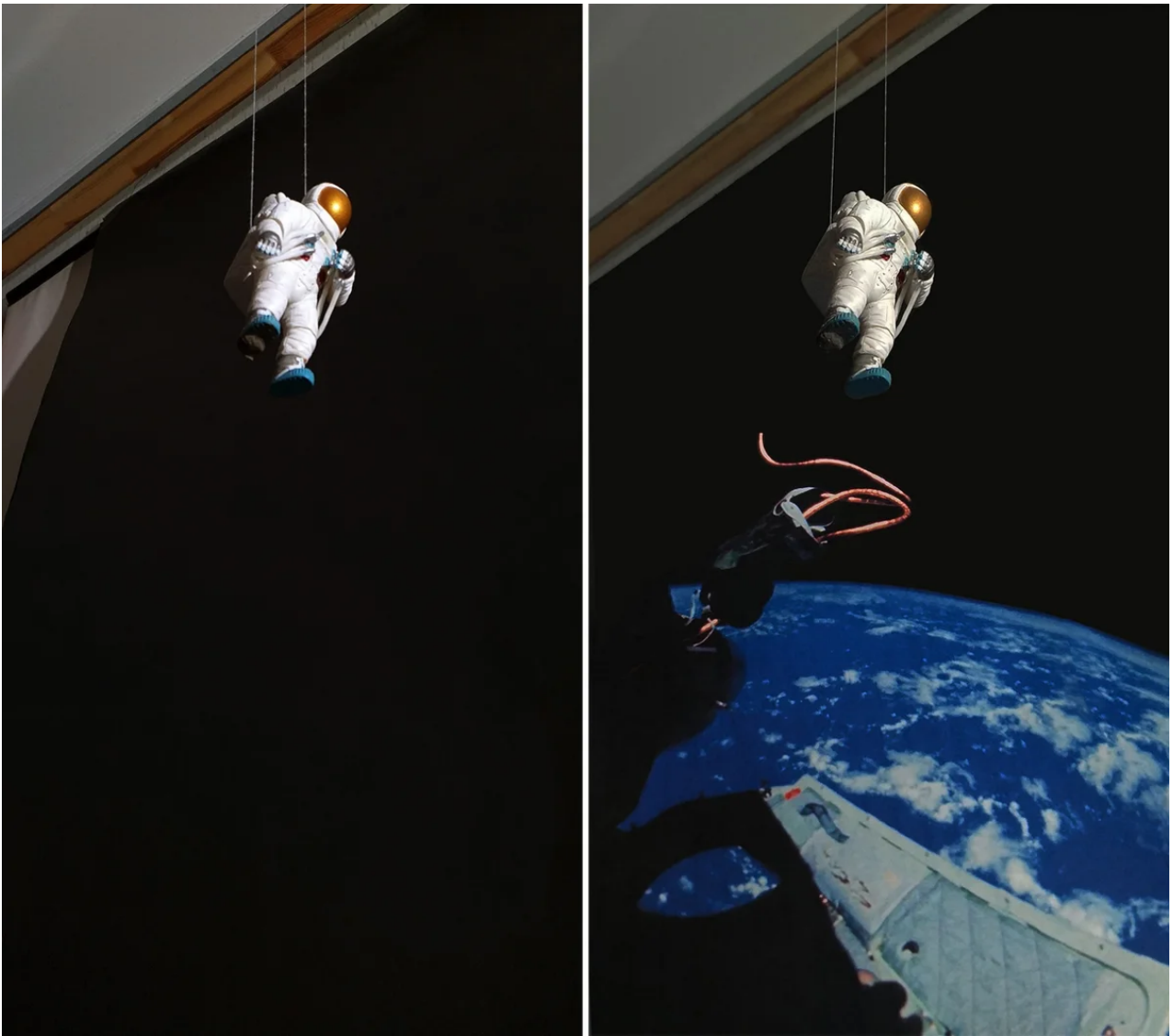


Fig. 36. Low-angle shot of an astronaut model against a black background.

Now add the capsule door to the frame, which is projected onto the cloud cover of the Earth - Figure 36, on the right.

We printed this lower part of the frame on a color printer from the NASA video, in A4 format - Fig. 37.



Fig. 37. Background, printed on a printer.

The sheet was glued onto black paper. Now, especially for you while photographing, we have illuminated a black sheet of paper so that it starts to glare at the bottom, and so that you can see all the stages of image transformation. The upper part of the leaf is noticeably blacker.

Then we put this drawing in front of the lens of our camera so that the black paper would not glare. A cell phone was used as a camera (to obtain a large depth of field).



Adding the Earth in the background to the frame.

Since we set up the exposition on a brightly lit white spacesuit, the black paper went into deep "darkness". At this moment, according to the NASA scenario, a glove falls on the Gemini's door. It is thrown onto the bends of the halyard and, bouncing off, it falls onto the open door - fig. 38.



Fig. 38. The moment of throwing in the glove.

Now we rotate our frame by 90° - and we get a “space walk” frame - Fig. 39.

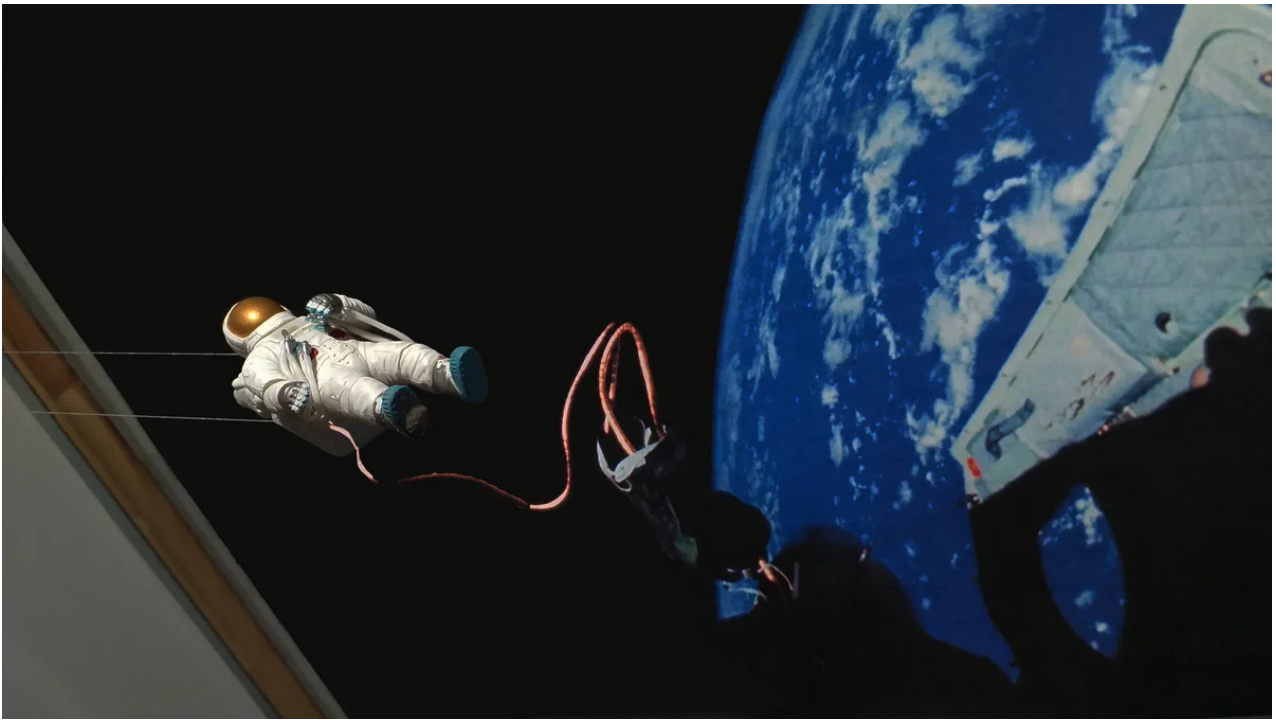


Fig. 39. Rotate the frame 90° .

Change the bright white suspension threads to thin steel cables - and the frame is ready - fig. 40.

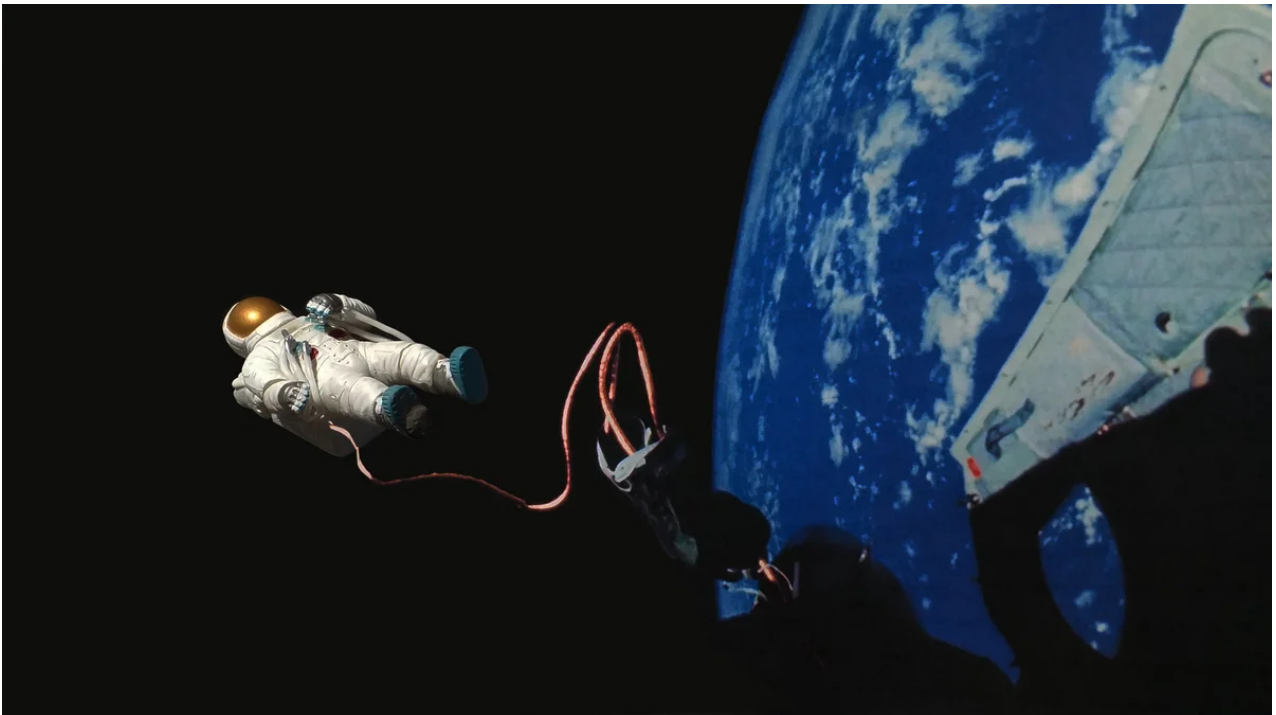


Fig. 40. Final shot.

As you can see, the astronaut practically does not need to move, it is enough to slightly move his arms and legs. We will put it even more categorically: he is forbidden to move, and you will soon understand why. The illusion of movement is created by the camera, which circles around the astronaut hanging on the cables. The trajectory of the camera movement is a circle, while the camera is inside the big drum (the diagram will be given a little later). But the approach and distance of the actor from the capsule is done with the help of a crane. We see that after two minutes of static, the astronaut begins to swim away from the capsule, and at 2 minutes

50 seconds, his distance has stopped. The crane stopped. In fact, we know that the action was filmed in reverse. First, the crane took the actor to the maximum distance, and then (at 2:50, timecode) began to move him closer to the capsule.

So watch what happens during filming. The crane is stationary, the arrow has taken the actor about 4 meters (due to the wide-angle lens, the distance seems to be greater). And then the boom of the crane starts to move. An actor who was in a static state receives an impetus to move, his body twitches, and therefore he involuntarily begins to swing his arms and legs to maintain balance. Whether you want it or not, there will be a push. And the actor will definitely jerk sharply. But such shocks cannot be in weightlessness, they simply have nowhere to come from. So that you do not pay attention to these shocks, the director of the film crew gives the task to the actor - at the moment of the push, sharply raise his hand, as if saluting.

This is what this push looks like - we cut out the fragment at 2:50 and repeated it three times at real speed. In addition, with a difference of several seconds, another push occurs - the time according to the timecode is 2:58-3:00. And you can also notice that when the crane moves, the suspension vibrates, this is especially noticeable in the time interval 7:48-8:01 (according to the timecode) - it feels like the astronaut is driving along an uneven road, on bumps. Especially striking is the moment when the suspended astronaut jerks his hand to the side. Since it hangs on a cable, then (according to Newton's third law) recoil follows - the legs twitch in the other direction. We repeated this last fragment twice.

VIDEO:

[Astronaut shaking \(swinging arms and legs\) and jolting when moving the crane.](#)

To make the tremors less noticeable, the speed of the display is slowed down by 4 times - and the sharp tremors turn into light swaying.

If the movie was edited in short frames, then these shocks would simply be cut out during editing. But since the whole scene was filmed in one long shot, it is necessary to distract attention from the shooting technique with cinematographic techniques.

Lest you think that this is some kind of unique solution, invented exclusively for this case (raise your hand, make a gesture during a push), I want to show two examples from the film "I-Cuba" (USSR, Mosfilm, 1962), where the inevitable technical shocks of the camera are masked by hand waves or a flag flapping in the wind.

At the beginning of the film "I-Cuba" the action takes place on the roof of a high-rise building, there is a screening of "Miss Beauty". The operator (S. Urusevsky) shoots this scene on the roof and then, without stopping the camera, goes into the side elevator (such elevators are used on construction sites), goes down two floors with it, where the pool is located, and, together with the camera, plunges under the water - Figure 41.



Fig. 41. Fragments of a long shot.

To prevent viewers from noticing the technical push when moving from the roof to the attached elevator (steadicams were not yet invented), the operator asks the commentator with a microphone to actively gesture with his hand - Fig. 42.



Fig. 42. The commentator is actively gesturing with his hand on purpose.

VIDEO: This is how it looks on [video](#):

In another case, the technical moment is masked by a waving flag. During a long panorama, the camera enters the window of the tobacco shop and flies out into the street through another window; then moves over the crowd of people (episode "Funeral of Enrique").

During the passage through the tobacco workshop, the operator holds the camera in his hands, and the departure through the window was filmed using a camera attached to the cable car. Approaching the window, the operator brings the camera to the ropes attached to the ceiling, and the assistants use magnets to attach the camera to the cable car. So that the shock is not noticeable at the moment of fixing the camera, at this moment the Cuban flag is hung out of the window, it flaps in the wind, and the viewer does not notice the start of the camera - Fig. 43.



Fig. 43. Shots of the camera leaving the window of the tobacco workshop.

VIDEO:

Here [video fragment of](#) this flight.

Now look again the first three minutes of White's spacewalk, from dropping the glove to bringing him to the capsule with a crane. Look how it was filmed in reality, that is, in reverse and without artificial slowing down. You will immediately find:

1. Shooting of a distant astronaut is carried out from a lower angle.
2. The glove falls down.
3. The actor is brought closer to the capsule using a crane boom.
4. During the approach of the actor, he is rotated around the axis by 90° with the help of the lyre mounted on the crane.
5. When the actor is practically in the capsule, they continue to slowly lower him lower and lower, so that he feels support under his feet.

VIDEO:

[Three minutes](#) of White's exit cutscene, reverse.

The next part will tell you about the trajectory of the filming camera, and what device was invented to move it. It will also show at what distance the background of the Earth's cloud cover was from the camera, and how the screen with the background was connected to the camera.

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Next, 4th part:

[Rotary decoration for weightlessness, or "Gemini-4" solution. Part 4.](#)

Previous parts:

[How the spacewalk was filmed in the pavilion, or the solution to Gemini 4. Part 1.](#)

[Where the glove flies, or the solution to "Gemini 4". Part 2.](#)

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Cameraman L. Konovalov was with you. Until next time!